

# Are "Medically Underserved Areas" Medically Underserved?

By Joel C. Kleinman and Ronald W. Wilson

A comparison of medically underserved areas (MUAs) and adequately served areas (ASAs) is presented. Nonmetropolitan areas represented in the Health Interview Survey (HIS) are classified as MUAs or ASAs by the official criterion of their scores on the Index of Medical Underservice (IMU), and HIS data from the two types of areas are examined for differences. Standard metropolitan statistical areas are also compared with the nonmetropolitan MUAs and ASAs. Results show no difference between MUA and ASA residents in number of physician visits per year or proportion with at least one visit in the past year, although MUA residents reported poorer health status, used some preventive services less, and used nonsurgical hospitalization more than did ASA residents. In general, most MUA-ASA differences tend to be similar in size to differences between ASAs and SMSAs. An alternative to the IMU, using HIS data to identify underserved areas, is discussed.

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Concern about the unavailability and inaccessibility of medical care in certain areas of the United States has led to the enactment of a variety of measures to correct the maldistribution of health resources. Among these measures is the Health Maintenance Organization Act of 1973 (P.L. 93-222), which gives priority for developmental funding of HMOs to areas designated by the Secretary of Health, Education, and Welfare as being "medically underserved." To identify such areas, DHEW funded a study by the University of Wisconsin Health Services Research Group to develop the Index of Medical Underservice (IMU) [1]. The IMU is also used to designate medically underserved areas for priority funding under the community health center program (Section 330 of P.L. 94-63) and portions of the Health Planning and Resources Development Act (P.L. 93-641).

Indexes such as the IMU, designed to identify areas for programmatic intervention, need data that are uniformly available for small areas across the United States (e.g., all counties). However, the small-

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area data currently available do not provide the specific measures needed to target programs. For example, there are no small-area data available on use of health resources or perceived access to medical care. Data on such variables are available, however, from surveys of probability samples of the U.S. population. These surveys can measure utilization levels, morbidity, or perceived access to medical care. Although they are not available for all counties, the survey data can be useful in evaluating a particular index and in developing alternative indexes that might better reflect program goals.

This article presents an evaluation of the medically underserved area (MUA) designation, using data from the Health Interview Survey of the National Center for Health Statistics. The phrase "adequately served area" (ASA) is used throughout the article to refer to areas that are not classified as medically underserved. It is used for convenient contrast with MUA, without any intended relevance except to the IMU area-score criterion.

## Defining Underservice

The IMU consists of four variables: infant mortality rate, physician/population ratio, percent of population age 65 and over, and percent of population below the poverty level. These variables are combined using weights derived from utility values that were determined by a group of experts. Although it was recognized that these variables do not measure medical underservice directly, they were correlated with expert assessments of underservice in a number of selected areas. Indeed, the Wisconsin group did not attempt to define medical underservice but instead determined that a consensus existed among the experts on their panels about which particular areas were underserved.

A critique of the IMU was presented by Wyson [2], who objected to the consensus approach because it did not define medical underservice. Davis and Marshall [3] also discussed many problems in identifying underserved areas. They warned that unwise policy may emanate from designation criteria that are not grounded in a sound conceptual framework. They suggested "defining underservice in terms of deviation from appropriate patterns and quality of care," although they recognized that implementation of such a definition is impossible at present because of problems of measurement, data availability, and lack of clear consensus on appropriate standards for treating most conditions. However, it is important to keep their suggestion in mind, since it implies that medical underservice should be defined not only by availability of resources, but also by need for resources, quality of resources, patterns of utilization, and health status outcomes.

Given these conceptual problems in defining medical underservice, the use of a consensus approach like the IMU seems especially unwise since it is not known what criteria the experts had in mind when they identified underserved areas. Yet the need to meet the

legislative mandate requires some sort of interim pragmatic approach. For example, it seems apparent that if an area is in fact medically underserved, its residents will generally have below-average utilization of health resources and will encounter more difficulty with access to medical care. In addition, the health status of underserved populations may be relatively lower. The purpose of this article is to examine the extent to which underserved areas defined by the IMU exhibit these characteristics in comparison with adequately served areas and to suggest alternatives to the IMU that may improve the designation process.

## Data Sources and Method of Analysis

Data for this study were drawn from 1973 and 1974 data tapes of the Health Interview Survey (HIS). Survey methodology is described and terms are defined in ref. 4. The HIS, conducted by the National Center for Health Statistics, is based on a national probability sample of 376 primary sampling units containing a total of 768 counties or independent cities. Interviews are conducted by the Bureau of the Census in approximately 40,000 households each year. In addition to the HIS data, a 10-percent simple random sample of all 1974 birth certificates [5] was examined for data on prenatal care and attendant at birth.

Designation of medically underserved areas for the HMO act is described in the *Federal Register* [6]. The median value of the IMU—62—for all U.S. counties has been chosen as a cutoff point between underserved and adequately served areas. Any nonmetropolitan county with an index of 62 or below is considered underserved. Of the 2,495 U.S. counties classified as nonmetropolitan in 1970, 56 percent had IMU scores of 62 or less. (Modifications of the list after planning agency review are not considered in this study.)

Since the MUA designation is implemented as a dichotomy, the data drawn from the HIS were dichotomized similarly. Respondents who did not live in Standard Metropolitan Statistical Areas (SMSAs) were classified as living in MUAs if their county of residence had an IMU score of 62 or less. Of the 360 nonmetropolitan counties represented in the HIS sample, 186, or 52 percent, were classified as MUAs. The remaining 48 percent of nonmetropolitan counties were taken as adequately served areas for statistical examination.

Some nonmetropolitan counties with IMU scores greater than 62 contain minor civil divisions or census-counting divisions, and some SMSAs contain census tracts, that are officially designated as medically underserved. It was not possible, for the present study, to identify the HIS respondents who lived in these locations, so such areas were excluded from this analysis. Approximately 6 percent of ASA residents and 12 percent of SMSA residents were thereby excluded.

Approximate standard errors of the estimates obtained were based on relative error charts [4]. The MUAs are compared with ASAs, with significance measured by a (two-tailed) normal deviate of the form

**Table 1. Selected Socioeconomic Characteristics of Underserved Areas, Adequately Served Areas, and Metropolitan Statistical Areas**

Characteristic	Metropolitan (SMSA)	Area type	
		Underserved (MUA)	Adequately served (ASA)
Population	141 736 000	27 466 000	36 596 000
Percent male, by age			
<17 .....	15.7	16.5	15.9
17-44 .....	19.0	17.1	17.8
45-64 .....	9.8	9.7	9.8
≥65 .....	3.7	5.1	4.7
Percent female, by age			
<17 .....	15.0	15.8	15.7
17-44 .....	20.4	18.0	19.2
45-64 .....	10.9	11.2	10.6
≥65 .....	5.4	6.7	6.3
Color, percent			
White .....	85.9	82.8	96.6
Black .....	12.7	16.5	3.0
Other .....	1.4	0.6	0.4
Family income, percent			
<\$5,000 .....	14.9	27.6	17.0
≥\$5,000 .....	77.8	64.9	76.4
Unknown .....	7.3	7.5	6.6

$$Z = (\bar{X}_1 - \bar{X}_2) / (\overline{SE_1^2} + \overline{SE_2^2})^{1/2}$$

where  $\bar{X}_1$  is the estimate for MUAs,  $SE_1$  is its standard error, and  $\bar{X}_2$  and  $SE_2$  are the corresponding values for ASAs. HIS data for SMSA residents are also presented for comparison, but the significance was not measured for differences involving them.

Socioeconomic differences between MUAs and ASAs may influence the results, but it is not appropriate to adjust for these differences in the present analysis since the question is whether residents of MUAs appear to have less access to medical care, for whatever reasons, than do ASA residents. Table 1 shows some basic socioeconomic characteristics of the three groups of areas. Note that the age and sex distribution of MUA residents is similar to that in ASAs; this similarity reflects the small contribution to IMU scores made by percentage of population age 65 and older. It also indicates that adjustment of the MUA-ASA differences for age and sex would not change the results. Substantial differences exist, however, in ethnic distribution (17 percent black in MUAs versus 3 percent in ASAs) and in family income (28 percent below \$5,000 in MUAs versus 17 percent in ASAs). Both these differences are due to the large contribution to the IMU made by the percentage of population below poverty level.

**Table 2. Physician Utilization by 1973 and 1974  
HIS Respondents in Three Types of Areas**

Measure	Area type		
	Metropolitan (SMSA)	Nonmetropolitan*	
		Underserved (MUA)	Adequately served (ASA)
Physician visits per person ...	5.2	4.5 ± 0.1	4.5 ± 0.1
Persons with at least one visit in previous year (%) ...	76.0	71.0 ± 0.3	73.4 ± 0.3
Visits by physician type (%)			
All visits .....	100.0	100.0	100.0
General practitioner .....	47.5	70.3 ± 0.9	61.8 ± 0.8
Internist .....	10.7	3.8 ± 0.4	5.6 ± 0.4
Obstetrician/gynecologist ....	7.4	4.2 ± 0.4	6.3 ± 0.4
Pediatrician .....	11.2	4.7 ± 0.4	7.3 ± 0.4
Other specialists .....	19.6	14.0 ± 0.6	16.6 ± 0.7
Visits by place (%)			
All visits .....	100.0	100.0	100.0
Office .....	67.1	73.7 ± 0.9	73.5 ± 0.7
Clinic .....	7.9	6.0 ± 0.4	5.0 ± 0.4
Emergency room .....	4.2	4.0 ± 0.4	3.8 ± 0.3
Telephone .....	13.4	8.6 ± 0.5	11.6 ± 0.5
Other .....	7.4	7.7 ± 0.5	6.1 ± 0.4

\* Data are shown plus or minus standard error.

## Results

### Physician Visits

The differences in physician utilization between underserved and adequately served areas are minimal, especially when these areas are compared with metropolitan areas (Table 2). The proportion of the population with at least one physician visit in the preceding year was 71 percent for MUAs and 73 percent for ASAs, with the difference significant at  $p < 0.001$ ; however, 76 percent of SMSA residents had at least one visit during the year. The annual number of visits per person was 4.5 for MUAs and ASAs alike, as compared with 5.2 for SMSA residents.

The distribution of visits by physician type was different in each group of areas: visits to general practitioners constituted 70 percent of MUA visits, compared with 62 percent in ASAs, significant at  $p < 0.01$ , whereas only 48 percent of SMSA visits were to GPs.

### Preventive Services

An important measure of the adequacy of primary care services is the extent to which a group uses preventive measures. Although the effectiveness of certain preventive measures is questionable, they seem to be a part of accepted medical practice. The 1973 HIS questionnaire included a battery of questions on the use of preventive

**Table 3. Use of Preventive Services by 1973 HIS Respondents in Three Types of Areas**

Measure	Metropolitan (SMSA)	Area type	
		Underserved (MUA)	Adequately served (ASA)
Age > 44			
No EKG for 2 yr (%) .....	63.2	71.3 ± 0.8	71.1 ± 0.8
Never had EKG (%) .....	30.7	41.9 ± 0.9	39.7 ± 0.8
No glaucoma test for 2 yr (%) ....	62.7	74.2 ± 0.8	68.7 ± 0.8
Never had glaucoma test (%) .....	35.1	51.0 ± 0.9	42.6 ± 0.8
Age > 16			
No chest X ray for 2 yr (%) .....	53.6	61.8 ± 0.8	62.1 ± 0.7
Never had chest X ray (%) .....	11.4	19.0 ± 0.5	15.9 ± 0.4
No eye exam for 2 yr (%) .....	47.4	55.4 ± 0.6	50.4 ± 0.5
Never had eye exam (%) .....	5.1	11.3 ± 0.4	4.7 ± 0.2
Age > 16, female			
No Pap smear for 2 yr (%) .....	40.6	49.9 ± 0.9	44.2 ± 0.8
Never had Pap smear (%) .....	19.5	27.6 ± 0.8	21.9 ± 0.7
No breast exam for 2 yr (%) .....	38.0	49.6 ± 0.9	43.6 ± 0.8
Never had breast exam (%) .....	17.4	27.9 ± 0.2	20.9 ± 0.7
Age < 17			
No routine physical for 2 yr (%) ..	33.3	52.8 ± 1.0	42.0 ± 0.8
Never had routine physical (%) ..	7.8	20.4 ± 0.8	9.1 ± 0.5
* Data are shown plus or minus standard error.			

\* Data are shown plus or minus standard error.

services [7]. Table 3 shows data for seven indicators of such use: the overall tendency is toward greater use in adequately served areas, with the greatest use of preventive services in SMSAs. The largest differences (all statistically significant at  $p < 0.001$ ) pertain to use of glaucoma tests for adults 45 and older (51 percent of MUA residents having never received one, in comparison with 43 percent in ASAs), routine physical examinations among children younger than 17 (20 percent of MUA children having never received one, compared to 9 percent in ASAs), eye examinations for those 17 and older (11 percent in MUAs having never received one, compared to 5 percent in ASAs), and Papanicolaou smear and breast examination for women 17 and over (28 percent in MUAs reported never having either, versus 21 percent in ASAs). As mentioned, metropolitan residents reported greatest use of all preventive services.

#### Obstetric Care

Limited information about obstetric care for 1974 births was obtained from a 10-percent sample of birth certificates [5]. Table 4 shows that 98.1 percent of live births in MUAs were delivered by physicians in hospitals, compared to 99.4 percent in both ASAs (significant with  $p < 0.001$ ) and SMSAs. Similarly, the proportion of births to mothers who began prenatal care in the first trimester of preg-

**Table 4. Obstetric Care Used by Residents of Three Types of Areas**

Care	Area type		
	Metropolitan (SMSA)	Nonmetropolitan*	
		Underserved (MUA)	Adequately served (ASA)
Delivery by physician			
in hospital (%) . . . . .	99.4	98.1	99.4
N, live births . . . . .	2 127 890	467 370	564 280
Month prenatal care started			
First or second (%) . . . . .	46.9	39.0 ± 0.3	42.2 ± 0.2
Third (%) . . . . .	26.4	26.6 ± 0.2	30.6 ± 0.2
Fourth-sixth (%) . . . . .	20.7	26.3 ± 0.2	22.2 ± 0.2
Seventh-ninth (%) . . . . .	4.6	6.4 ± 0.1	4.2 ± 0.1
No prenatal care (%) . . . . .	1.5	1.7 ± 0.0	0.8 ± 0.0
N†, live births . . . . .	1 851 290	381 081	499 110

\* Data are shown plus or minus standard error.

† Births for which data on prenatal care were reported. In the 42 states that report this item, the information was omitted for 3.9% of SMSA births, 5.6% of MUA births, and 3.7% of ASA births.

nancy was lower in MUAs (66 percent) than in ASAs (73 percent), with the difference significant at  $p < 0.001$ . This difference diminishes, however, when only the first two months of pregnancy are considered, and both MUAs and ASAs appear at a disadvantage relative to SMSAs.

### Hospitalization

MUA residents used hospital care appreciably more than ASA residents, as shown in Table 5. The hospital discharge rate for

**Table 5. Short-term Hospital Utilization (Excluding Deliveries) by 1973 and 1974 HIS Respondents in Three Types of Areas**

Measure	Area type		
	Metropolitan (SMSA)	Nonmetropolitan*	
		Underserved (MUA)	Adequately served (ASA)
Discharges per 100 persons .	11.7	16.2 ± 0.4	13.6 ± 0.3
Surgical . . . . .	6.0	5.9 ± 0.2	6.1 ± 0.2
Nonsurgical . . . . .	5.7	10.3 ± 0.3	7.5 ± 0.3
Hospital days per 100 persons . . . . .	107.0	131.5 ± 5.4	105.9 ± 4.2
Average length of stay . . . .	9.1	8.1 ± 0.4	7.8 ± 0.4

\* Data are shown plus or minus standard error.

**Table 6. Disabilities and Perceived Health Status of 1973 and 1974 HIS Respondents in Three Types of Areas**

Measure		Area type	
		Metropolitan (SMSA)	Nonmetropolitan*
			Underserved (MUA)
Self-assessed† health fair or poor (%) .....	11.6	19.6 ± 0.3	12.3 ± 0.2
Activity limited by chronic conditions (%) ..	13.1	17.0 ± 0.3	14.2 ± 0.2
Disability days per person (days) .....	16.7	19.9 ± 0.5	15.0 ± 0.3

\* Data are shown plus or minus standard error.  
† Includes proxy assessment of other household members by respondent.

MUAs was nearly 20 percent higher than for ASAs, and the number of hospital days per 100 persons was 24 percent higher; both these differences are significant with  $p < 0.001$ . The entire difference in the discharge rate was due to nonsurgical cases, since the surgical discharge rates were almost identical. The nonsurgical discharge rate in MUAs was 21 percent higher than in ASAs and 49 percent higher than in SMSAs. The average lengths of stay were similar for MUAs and ASAs, and both were one day lower than for SMSAs.

### Health Status

An overall measure of perceived health status is included in the HIS. Respondents were asked, for each member of their households: "Compared to other persons \_\_\_\_\_'s age, would you say that his health is excellent, good, fair, or poor?" (Kovar and Wilson [8] concluded that there is little difference between self-reports and reports by one household member about another when the "fair" and "poor" categories are combined.) The percentage reporting fair or poor health is shown in Table 6, together with data on disability days and the percentage of persons whose activities were limited by chronic conditions. Here the MUA-ASA differences are substantial, and are all significant at  $p < 0.001$ . Nearly 20 percent of MUA residents reported fair or poor health, compared with 12 percent of ASA residents. This difference is reflected in the more objective measures: 20 disability days per person per year in MUAs compared with 15 in ASAs, and 17 percent of MUA residents limited in activity by chronic conditions compared with 14 percent in ASAs. The results for metropolitan areas are similar to those for nonmetropolitan ASAs.

### Access to Care

Respondents who reported acute conditions that led to physician visits were asked additional questions about their access to care on



**Table 7. Access to Care: Travel Time, Waiting Time, and Satisfaction Among 1973 and 1974 HIS Respondents in Three Types of Areas Who Sought Care for Acute Conditions**

Measure	Metropolitan (SMSA)	Area type	
		Underserved (MUA)	Adequately served (ASA)
Difficult travel to physician (%) . . . . .	9.2	7.2 ± 1.0	7.3 ± 1.0
Travel time			
>15 min (%) . . . . .	52.4	57.9 ± 2.0	48.2 ± 1.9
>30 min (%) . . . . .	17.1	25.2 ± 1.8	16.0 ± 1.4
>1 hr (%) . . . . .	2.2	5.2 ± 0.9	2.7 ± 0.6
Wait for care too long (%) . . . . .	23.2	21.2 ± 1.6	18.4 ± 1.4
Waiting time ≥ 1 hr (%) . . . . .	20.1	26.1 ± 1.8	16.7 ± 1.4
Satisfied with care received (%) . . . . .	91.4	92.6 ± 1.0	92.7 ± 1.0

\* Data are shown plus or minus standard error.

those visits. Although the resulting data (shown in Table 7) relate only to those who actually had physician visits, the total volume of visits was similar for MUAs and ASAs.

One-fourth of the MUA residents, but only 16 percent in ASAs, traveled more than 30 minutes to their physician visits. In both groups only 7 percent reported difficulty traveling. Among SMSA residents 17 percent traveled more than 30 minutes and 9 percent stated they had difficulty traveling; in both respects they resemble the ASA residents.

Similar results were found for waiting time. Although the difference between MUAs and ASAs in percentage waiting more than one hour is statistically significant, no significant difference was found for those who perceived their waiting time as too long.

Responses to questions on travel and waiting time are highly subjective, and the SMSA findings suggest that responses may be influenced by expectations. Despite the substantial proportion of persons with long travel and waiting times, over 90 percent of the respondents in all three groups of areas claimed they were satisfied with the care received.

#### Usual Source of Care

In 1974 the Health Interview Survey included a special section asking about the usual source of medical care and problems in obtaining medical care. Table 8 shows the percentage of persons who

**Table 8. Usual Source of Care for 1974 HHS Respondents  
in Three Types of Areas**

Measure	Metropolitan (SMSA)	Area type	
		Underserved (MUA)	Adequately served (ASA)
Have usual source (%) .....	79.9	80.4 ± 0.8	82.8 ± 0.7
No usual source (%) .....	15.2	15.9 ± 0.7	13.0 ± 0.5
Usual source			
All physician types (%) .....	100.0	100.0	100.0
No particular physician (%) .....	10.1	5.8 ± 0.5	5.3 ± 0.4
General practitioner (%) .....	57.1	75.6 ± 0.9	71.3 ± 0.8
Internist/pediatrician (%) .....	22.7	8.8 ± 0.6	14.0 ± 0.6
Obstetrician/gynecologist (%) .....	4.3	2.5 ± 0.3	3.3 ± 0.3
General surgeon (%) .....	1.8	3.7 ± 0.4	2.2 ± 0.3
Other and unknown (%) .....	4.0	3.6 ± 0.4	3.9 ± 0.3
Location of usual source			
All locations (%) .....	100.0	100.0	100.0
Physician office (%) .....	61.5	67.2 ± 1.0	64.4 ± 0.9
Hospital clinic or emergency room (%) .....	6.7	3.8 ± 0.4	1.7 ± 0.3
Group practice (%) .....	26.7	25.2 ± 0.9	30.5 ± 0.8
Other and unknown (%) .....	5.1	3.8 ± 0.4	3.4 ± 0.3
Reason for no usual source			
All reasons (%) .....	100.0	100.0	100.0
No need (%) .....	54.0	53.4 ± 2.6	55.8 ± 2.5
Different physician for each problem (%) .....	18.1	18.7 ± 2.1	16.0 ± 1.8
Can't find right physician (%) ...	8.3	4.7 ± 1.1	7.1 ± 1.3
Previous physician not available (%) .....	6.9	7.8 ± 1.4	10.2 ± 1.5
Other and unknown (%) .....	12.7	15.4 ± 1.9	10.9 ± 1.5

\* Data are shown plus or minus standard error.

reported having a usual source of care to be 80 percent in MUAs, 83 percent in ASAs, and 80 percent in SMSAs. The distribution of respondents by type of physician used as the usual source of care is quite similar to the distribution of physician visits in Table 2. General practitioners were used by more MUA residents (76 percent) than residents of ASAs (71 percent) or SMSAs (57 percent); internists or pediatricians were used by fewer MUA residents (9 percent) than ASA (14 percent) or SMSA residents (23 percent). There was no difference between the residents of MUAs and ASAs in reporting "no particular physician" as their usual source of care, but nearly twice as many SMSA residents (10 percent) made this response. The place of usual care was predominantly a physician's office for all three groups, although most often in MUAs (67 percent), less often in ASAs (64 percent, with the difference significant at  $p < 0.05$ ), and least often in

**Table 9. Problems in Obtaining Care Reported by 1974 HIS Respondents in Three Types of Areas**

Problems reported	Area type		
	Metropolitan (SMSA)	Nonmetropolitan*	
		Underserved (MUA)	Adequately served (ASA)
At least one problem in past year (% of all respondents) .....	10.5	10.1 ± 0.5	10.1 ± 0.5
Percentage of those with at least one problem reporting:			
No physician available .....	24.7	30.1 ± 2.7	29.6 ± 2.3
Cost .....	24.7	29.3 ± 2.7	20.8 ± 2.1
Lack of transportation .....	11.5	14.1 ± 2.1	10.0 ± 1.5
Inconvenient office hours .....	16.9	13.7 ± 2.0	15.2 ± 1.8
Hard to get appointment .....	47.3	42.3 ± 2.9	53.4 ± 2.6
Not enough care (% of all respondents) .....	6.2	6.7 ± 0.5	4.5 ± 0.3
Percentage of those with not enough care reporting:			
Too expensive .....	47.9	55.0 ± 3.6	45.3 ± 3.8
Difficulty getting to physician .....	8.2	9.2 ± 2.1	8.0 ± 2.1
Can't get appointments .....	13.1	13.8 ± 2.5	17.3 ± 2.9
Inconvenient office hours .....	7.2	4.7 ± 1.5	5.1 ± 1.7
Physician spends inadequate time .....	14.3	12.7 ± 2.4	13.9 ± 2.7

\* Data are shown plus or minus standard error.

SMSAs (62 percent). The use of hospital clinics or emergency rooms, although generally low, was more frequent in SMSAs (7 percent) than in MUAs (4 percent) or ASAs (2 percent); the latter difference is significant at the 0.001 level. The use of group practices was greatest in ASAs (31 percent) and least in MUAs (25 percent), with SMSAs falling in between (27 percent).

Respondents with no usual source of care were asked why they had none. The most common reason was that they didn't need one. The differences among the three groups are about two percentage points or less and are not significant.

### Problems in Getting Care

Table 9 shows that only 10 percent of the respondents in each group reported having problems getting medical care during the preceding year. It is interesting that, for those who reported one or more problems, there was no difference between MUAs and ASAs in the proportion (30 percent) citing no physician available as a problem. In SMSAs, 25 percent of those with problems cited this one. In MUAs 29 percent of those with problems cited cost, compared to 21 percent in ASAs; this difference, significant at the 0.05 level, is probably due to the large differences in income shown in Table 1. The problem most frequently cited in all three areas was getting an ap-

**Table 10. Usual Source of Care and Problems in Obtaining Care for 1974 HHS Respondents with Health Problems in Three Types of Areas**

Measure	Metropolitan (SMSA)	Area type	
		Underserved (MUA)	Adequately served (ASA)
Health problem† (% of all respondents) .....	18.8	25.7 ± 1.0	20.0 ± 0.8
Percentage of those with health problem who:			
Have usual source of care .....	83.2	84.4 ± 1.3	85.4 ± 1.3
Have no usual source of care ....	12.1	12.7 ± 1.2	10.8 ± 1.1
Made one or more physician visits in past year .....	87.0	82.9 ± 1.4	83.2 ± 1.4
Had problem in getting care in past year .....	18.0	15.9 ± 1.6	17.0 ± 1.6
Did not get enough care .....	12.1	14.1 ± 1.5	9.9 ± 1.2
Percentage of those with problem getting care reporting:			
No physician available .....	23.5	26.0 ± 5.3	24.1 ± 4.8
Cost .....	32.7	39.7 ± 6.9	31.5 ± 5.7
Lack of transportation .....	17.9	21.0 ± 4.7	18.5 ± 4.1
Inconvenient office hours .....	16.1	9.7 ± 3.0	12.5 ± 3.3
Hard to get appointment .....	41.3	33.1 ± 6.2	46.4 ± 7.3
Percentage of those with not enough care reporting:			
Too expensive .....	52.5	64.8 ± 10.2	57.1 ± 10.9
Difficulty getting to physician ....	11.3	12.9 ± 3.8	9.8 ± 3.8
Can't get appointments .....	13.7	11.3 ± 3.5	13.6 ± 4.5
Inconvenient office hours .....	5.7	3.2 ± 1.0	4.3 ± 2.4
Physician spends inadequate time .	17.0	11.5 ± 3.5	19.4 ± 5.5

\* Data are shown plus or minus standard error.

† Health problems included are limitation of activity by chronic conditions and fair or poor perceived health status.

pointment as soon as the respondent felt he needed one, but this was less common in MUAs than in ASAs, by nearly 10 percentage points. The 4-point difference between MUAs and ASAs in transportation problems reported is not statistically significant.

A question related to the one about problems in getting care is whether the respondent was getting as much care as needed; negative responses are shown in Table 9. The small difference of 2 percentage points between MUAs and ASAs is statistically significant at  $p < 0.001$ . Among those not getting needed care, "too expensive" was the major reason, cited by 55 percent in MUAs and 45 percent in ASAs.

#### Access to Care Among Those with Health Problems

In order to sharpen the analysis of perceived access problems, some of the data were retabulated to include only respondents with

health problems: those who reported either limitation of activity by chronic conditions or fair-to-poor health status. Table 10 shows, as expected from previous results (Table 6), that such reports were more frequent in MUAs (25.7 percent) than in ASAs (20.0 percent, with the difference significant at  $p < 0.001$ ). However, among those with health problems, there was no difference between MUAs and ASAs in the percentage having a usual source of care or the percentage making at least one physician visit in the past year. In both types of areas the percentage of persons with problems who had made at least one physician visit in the past year was about 10 points higher than among the general population. The reasons for not having a usual source of care (not shown in Table 10) were similar to those found in the entire sample except that a smaller proportion cited no need for a physician and a larger proportion cited use of different physicians.

Problems obtaining care during the past year were reported with about the same frequency by those in poor health from MUAs, ASAs, and SMSAs and somewhat more frequently than by the general population. Among the access problems cited, cost, transportation, and trouble getting appointments were more frequent, and physician availability and inconvenient office hours were less frequent, than among the general population.

There was a difference, significant at  $p < 0.05$ , between MUAs and ASAs in those reporting that they were not getting as much care as needed: 14 percent in MUAs and 10 percent in ASAs; these percentages are roughly twice as high as those for the entire sample. The reasons for not getting enough care followed patterns similar to those observed for the general population, although cost was cited much more frequently.

It is difficult to draw clear conclusions about the MUA-ASA differences observed here because of the large sampling errors involved in the estimates for those with health problems.

## Summary and Discussion

With respect to ambulatory care utilization, the differences between MUAs and ASAs are most evident in the use of preventive services and prenatal care (Tables 3 and 4), with MUAs having the lower utilization. Even in these instances, however, the MUA-ASA difference is often similar to the difference between SMSAs and the nonmetropolitan areas classified as adequately served. The lack of a difference between MUAs and ASAs in volume of physician visits and the small difference in the proportion of those with one or more visits during the year should be considered in connection with the greater need for services in MUAs that is indicated by the health status measures shown in Table 6. These findings suggest that a need-adjusted utilization measure (for examples, see Aday and Andersen [9] and Davis and Reynolds [10]) might show the MUA residents to have, in fact, less access to care than ASA residents. In addition, the differ-

ences between SMSAs and ASAs are slight on health status but large in terms of physician visits, which suggests that a need-adjusted utilization measure might show a deficit even in the ASAs. Further analysis along these lines is now being attempted.

The nonsurgical hospital discharge rate was significantly higher in MUAs (Table 5), indicating that some fraction of the greater need in MUAs was being met by hospital care rather than ambulatory care. It may be that the lack of ambulatory care leads to more serious problems that require hospitalization or that inpatient care is used as a substitute for ambulatory care. It is also possible that some portion of this difference could be explained by different patterns of medical practice. In any case, the cost implications of this finding warrant further study.

In terms of reported problems with access to medical care, the differences between MUAs and ASAs were not large. Eighty percent of MUA residents and 83 percent of ASA residents had a usual source of care, 7 percent in MUAs and 5 percent in ASAs reported not getting needed care, and only 10 percent in each group reported one or more problems in getting medical care within the past year. Among the problems experienced, appointment difficulties were a major factor, with cost and physician availability of lesser importance. The findings on access (Tables 7-10) point up the difficulty of relying on reported problems in identifying underserved areas. The proportion of the population expressing dissatisfaction with the medical care received or reporting problems in obtaining needed care was small. Different levels of expectation also influence such responses, as illustrated by the fact that, although the proportion of MUA residents who had travel times longer than 30 minutes was 9 percentage points higher than the corresponding proportion in ASAs, both groups reported the same frequency of difficulty in travel to a physician.

The implication of these findings for designating medically underserved areas is that the concept of medical underservice needs to be examined and specified more carefully, possibly along the lines suggested by Davis and Marshall [3]. Objective standards of appropriate care should be agreed on and underservice defined as deviations from those standards.

In the interim, we suggest an alternative to meet the need for a method of identifying medical underservice. This alternative involves the use of the HIS to develop and test indirect indexes of underservice along the lines of the present analysis. For example, suppose it were agreed that persons with limitation of activity due to chronic conditions would be considered underserved if they had, say, fewer than four physician visits per year, and those not limited would be classified as underserved if they had not seen a physician within the last two years.

It would then be possible to use the HIS sample to develop a discriminant function to weight the demographic characteristics of respondents and the characteristics (including availability of health

resources) of the county or census tract in which they live, in order to distinguish between underserved and adequately served *respondents*. This discriminant function could then be used on an area basis as a predictor of the proportion of that area's population that was underserved. The index thus defined could serve as one designation criterion for MUAs. Of course the definition of underservice should be more detailed than the example used above; it would be desirable, for example, to add some qualitative factors to the definition by giving less weight to visits involving long waiting or travel times and frequent changes in providers. The efficacy of the discriminant function could be tested by using a random portion of the HIS sample for validation.

The major advantage of this approach over the Index of Medical Underservice is that the criteria for underservice would be specified. Since the IMU is based on a consensus among experts that has no explicit basis, it is difficult to know what differences between MUAs and ASAs are expected. In fact, the preceding analysis shows rather small differences in both utilization and reported problems.

Although the discriminant function approach involves some arbitrary decisions, they would at least be clearly specified. Another advantage is that different criteria for defining underservice could be used for different programs or policy needs: for example, data on dental visits could be used in designating areas with shortages of dental services.

It is important to emphasize once again that this alternative is an interim solution that does not address the basic conceptual and measurement problems identified by Davis and Marshall [3] or Wysong [2]. More research on these problems is called for, especially in light of the resources being devoted to programs aimed at achieving equity for "underserved" and "manpower shortage" areas.

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